REMARKS

In the Office Action dated March 13, 2003, the Examiner made the following rejections:

1. Claims 4 and 7 were rejected under 35 USC §112, second paragraph, as indefinite. Applicants have amended claim 4 and cancelled claim 7.

2. Claims 1 and 3-7 were rejected under 35 USC §102(b) as anticipated or under §103(a) as obvious in view of Shell (USP 4,024,051) or Gillespie (USP 3,558,470). The Examiner stated that Shell taught the use of an anti-foulant (inorganic phosphorous-containing acid such as phosphoric acid) added to a crude oil that was subsequently refined at 100 - 1500°F (with examples teaching concentrations of 10 ppm and 300 ppm). The Examiner concluded that the Shell process would "inherently" inhibit corrosion. The Examiner also stated that Gillespie teaches an anti-foulant process containing the condensation product of long chain alkyl or alkenyl monocarboxylic acids and at least one polyalkylamine plus an additional agent that may include phosphorous acid. The Examiner concluded that the process would "inherently" inhibit corrosion, since phosphorous acid "is a known conventional inhibitor for metal surfaces." (citing Wilson, USP 4,389,371 and Konig-Lumer, USP 4,358,389)

The Examiner also rejected claim 2 under 35 USC §102(b)/103(a) as obvious over Shell or Gillespie. With respect to obviousness, in the case of the above references, the Examiner stated that one skilled in the art would be motivated to add phosphorous acid to organic acid containing petroleum streams because those streams are encompassed by the crude petroleum starting material used in the disclosed processes and that naphthenic acids are often contained in crude petroleum products.

The Examiner also made certain comments (see p. 3 of Office Action) concerning his interpretation of the requirements of claim 1 and claims 3-7, specifically, that claim 1 did not require that the phosphorous acid agent be incorporated into an organic acid containing petroleum stream, but only that the corrosion-prone metal surface be one, that is "to be" exposed to such a stream (and citing claim 2 as proof). As a result of this interpretation, the Examiner considered moot, Applicants' temperature range limitations, and any process means (e.g. phosphorous acid alone or in media such as petroleum products).

Applicants submit that the Examiner's reading of the claims is inaccurate for the following reasons. As indicated in the Specification (p. 3), the corrosion-prone metal surface that is the candidate for exposure to the organic acid-containing petroleum stream, is dosed ("provided", in claim 1) with a corrosion-inhibiting amount of phosphorous acid. The environment in which this treatment is carried out is clearly the hydrocarbon (i.e. essentially non-aqueous) environment in which petroleum processes are operated. The the metal surface may be dosed with phosphorous acid either before the organic acid-containing stream is added or with that stream. For clarity, Applicants have added the phrase "in an essentially non-aqueous environment (see Specification at p. 3) to identify the phosphorous acid delivery system. Applicants have also specified the temperature range characteristic of the "high temperature" corrosion and have identified that treatment is delivered to the "internal" metal surface of the "equipment" that will be exposed to the organic acid-containing petroleum stream.

As discussed in further detail below, Applicants submit that these clarifications address the issues raised by the Examiner in connection with the Shell and Gillespie references on which the §102/103 rejections were made, as well as in connection with the Wilson and Konig-Lumer references.

Applicants submit that one skilled in the art would not read Shell, as the Examiner suggests, as treating organic acid-containing crudes. Rather, Shell treats sour crudes with anti-foulants. "Sour" crudes are stated in Shell (see col. 12, line 9), and known to those skilled in the art, to be sulfur-containing crudes, not organic acid-containing crudes. In column 5, lines 28-44, and especially lines 40-44, Shell describes the nature of fouling deposits and distinguishes these from those formed by corrosion. Knowing this, one skilled in the art would read that Shell not only did not recognize that phosphorous acid could not behave as a corrosion inhibitor, but also that Shell taught away from treating corrosion inhibition; Shell focused only on fouling mitigation and prevention. There is no teaching in Shell that corrosion was a problem to be solved or that fouling and corrosion necessarily occur together in all crudes. Additionally, Shell (col. 8, lines 16-21) even teaches away from the use of phosphorous (and other) acids in favor of the use of amine salts as anti-fouling agents, stating that these acids cause equipment corrosion. Those skilled in the art would, therefore, not be inclined to consider phosphorous acid as a corrosion inhibitor. Rather, based on Shell, they would expect some anti-fouling behavior accompanied collaterally by equipment corrosion.

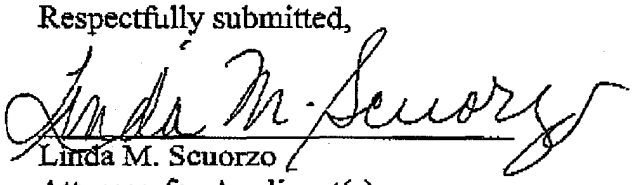
Applicants submit that Gillespie also teaches the treatment of fouling problems by addition of phosphorous acid (if used at all) in mandatory combination with specific condensation products (salts of acids). Gillespie does not teach nor suggest that phosphorous acid successfully may be used alone as an anti-foulant, and, in fact teaches away from such a use (col. 3, lines 42-45). Thus, there is nothing in Gillespie to teach or suggest to one skilled in the art that fouling and corrosion may be equated; and even assuming for the sake of argument, that one could legitimately equate them, one skilled in the art would be compelled to conclude that since phosphorous acid "when added alone to feedstocks... does not effectively serve as an anti-foulant," it also would not serve as an organic acid corrosion inhibitor. Additionally, although Gillespie teaches treatment of a variety of crudes, the reference makes no suggestion that they contain organic acid-containing species. In fact, since some crudes might, but others donot contain those species. Therefore, when the

Gillespie reference treats crudes to decrease fouling it can not "inherently" also treat organic acids, since there is no teaching or suggestion in Gillespie that all of the listed crudes necessarily contain organic acids. There is no extrinsic evidence supplied by the Examiner that "make[s] clear that the missing descriptive matter " (i.e. that organic acids are present in Gillespie's feeds and that phosphorous acid treats high temperature organic acid corrosion of metal surfaces) "is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill. Inherency... may not be established by probabilities or possibilities." (MPEP §2112). As discussed above, the term "sour" is a term of art in petroleum processing, which means sulfur-containing not organic acid-containing. Thus, Gillespie does not teach nor suggest the treatment of organic acid-containing feeds, and the knowledge that and how such treatment may successfully be accomplished is supplied by the Examiner, not from the reference, but rather using hindsight and Applicants' teachings.

With respect to Wilson (USP 4,389,371) and Konig-Lumer (USP 4,358,389), mentioned by the Examiner, Applicants wish to point out that both involve the use of phosphorous acid in aqueous media and at lower temperatures than the high temperatures at which organic acid corrosion occurs in refinery process equipment. Wilson does not, as the Examiner suggests, directly teach that phosphorous acid is a known, conventional corrosion inhibitor. Rather, Wilson teaches one skilled in the art that phosphorous acid is useful only in aqueous environments in which the "compositions [are] adapted to be diluted with water" (col. 1, line 17). Konig-Lumer also disclose an aqueous system that is a liquid de-icing agent. There is no suggestion that the agent, which is used at or around freezing temperatures, would be successfully used in high temperature, non-aqueous refinery processes. Thus, one skilled in the art would not consider these teachings to be applicable to a process such as that invented by Applicants, which is operated in (as the amended claims indicate) the essentially non-aqueous environment characteristic of petroleum processing.

Applicants believe that the claims now present in this application to be patentable and that this application is in condition for allowance, and such favorable action is respectfully requested. If any questions or issues remain, the resolution of which the Examiner feels would be advanced by a conference, he is invited to contact applicants' attorney at the telephone number noted below.

Respectfully submitted,



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☐ Pursuant to 37 CFR 1.34(a)

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